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COMPLETE SPECIFICATION.

Improvements in Devices for removing Plaster Casts or Bandages

We, CORNELIS JOHAN AANDEWIEL, of Lange Kerkdam 103, Wassenaar, JOHANNES MAAKTEN EERHARD, of Lange Kerkdam 113, Wassenaar, and CASPER EERHARD, of Bezuidehoutscheweg 397, The Hague, all of the Netherlands, and all of Dutch nationality, trading as FIRMA EERHARD-AANDEWIEL, of Lange Kerkdam 113, Wassenaar, the Netherlands, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention is concerned with a device for cutting or chipping away plaster bandages or plaster casts, of the type including a motor-actuated punch or chisel which is adapted to co-operate with a spoon or anvil inserted between the plaster bandage or cast and the part of the body encased by the latter.

It is an object of the invention to improve the known devices of this kind, and the improved apparatus according to the invention can be more readily operated, and when using the apparatus the bandage or cast can be cut or broken away without the patient being hurt in any way. Moreover, the device according to the invention has the further advantage that it can be satisfactorily adapted to the shape of the body and the cutting away of bandages which follow parts of very pronounced curvatures occasions no difficulty.

A rapid operation is, moreover, possible and the portions of the plaster cut away are conducted away in a simple and effective manner. The device according to this invention also has the advantage that its use does not involve the production of dust, and this must be regarded as an improvement of considerable importance having regard to the conditions under which the apparatus has to be employed.

According to the present invention, therefore, we provide an apparatus for removing plaster casts or bandages including a motor-actuated punch or chisel, and a co-operating anvil or spoon which is adapted to be inserted between the body and the bandage or cast, said punch or chisel having its lower portion of U- or

channel-form in cross section with the open side of the U facing a connection piece between the anvil or spoon and the main body of the apparatus.

Each upward and downward reciprocating stroke of the chisel produces an impact which cuts away a small section of the plaster having a width corresponding to the width of the opening of the U in the chisel cross section.

According to another feature of the invention, means are provided for enabling the pieces of plaster to be borne away through the chisel or punch itself, directly after they have been severed or broken away. To this end the upper portion of the chisel or punch may be of U-form with the open side of the U facing away from the connecting piece by means of which the anvil is secured to the remainder of the apparatus.

Another feature of the invention lies in making the distance between the outer walls of the limbs of the U smallest in the neighbourhood of the cutting edge. Consequently the slot through the punch or chisel may be somewhat constricted adjacent this cutting edge. The cutting away of a bandage which follows a line of pronounced curvature is thereby facilitated.

To ensure an accurate positioning and guiding of the punch or chisel, the latter may be provided by the present invention with a pair of guide cheeks or lugs located one on each side of the connecting piece.

In order to centre the punch in an absolutely accurate fashion a chisel-like guiding member may be furnished between the guiding cheeks or lugs and arranged to slide in a guiding slot in the connection piece.

With the apparatus described above, it is possible that pieces of material or plaster severed from the bandage or cast might congregate at the lower end of the guiding slot and consequently interfere with the operation of the punch or chisel. To prevent this, in another feature of the invention the downwardly directed cutting edge of the chisel-like guide body referred to in the preceding paragraph is made to co-operate with a second cutting edge in the lower end of the guide slot. By this

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means any materials collecting in the slot will be cut or smashed up when the punch performs its downward stroke and will thus be prevented from causing jamming or interference with the guiding action.

Further advantageous features of the invention will be disclosed by the ensuing description, which refers to the accompanying drawings wherein one embodiment of the invention has been illustrated by way of example.

In these drawings:—

Figure 1 is a side view of a device according to the invention,

Figure 2 is a longitudinal section on II—II of Fig. 1 and is drawn on an enlarged scale,

Figure 3 is a front elevation of the same device with a part shown in section on III—III of Fig. 1,

Figure 4 is a section on the line IV—IV of Fig. 3, showing the punch or chisel in its lowest position, and also the anvil, and

Figure 5 is a section on V—V of Fig. 4 viewed in the direction of the arrow.

Referring to the drawings, the ramming tool, which is here a chisel or punch of hollow form, is depicted by the numeral 1, and 2 is the electric motor which actuates this punch through the intermediary of the operating mechanism 3. The motor may be of any desired type and adapted for connection to the local current mains.

The punch 1 co-operates with a small anvil or spoon 4 which, when the device is in use, is pushed under the bandage or cast and at the same time acts as a guard since it prevents injury of the part of the body around which the bandage is wound.

The anvil 4 is attached to the casing 5 of the actuating mechanism by a connection piece or bracket 6 (see Figs. 1, 3 and 4) which is provided with a guide slot 7 extending parallel to the medial line of the plunger. A guide block 8 is movable in the slot 7 and is arranged between a pair of lugs 9 projecting laterally from the lower part of the punch or chisel. A cutting edge 10 is provided at the lower end of the guide block for cutting or breaking up small portions of the bandage material, plaster and so on, which may accumulate in the slot 7 during the use of the device. Co-operating with this cutting edge is a corresponding fixed cutting edge 44 in the lower end of the guide slot 7.

The upper part of the anvil 4 slopes upwardly to a certain extent in the direction of the slot 7, whereby this anvil can be pushed between the bandage and the body like a wedge. At the part remote from the guideway 7, the lower end of the punch 1 has a sharp angle whereby the material to be broken through more

readily yields to the punching action.

Figure 4 clearly illustrates the construction of the punch or chisel. A horizontal section through the lower end of the punch will be of U-shape. If the section is taken higher up, however, the shorter side of the U disappears and at sections still higher it moves to the other side of the limbs. In this way the channel 43, referred to above, is formed and serves the purpose of receiving and disposing of the small strips or splinters smashed or cut from the bandage. From this Figure it will also be noted that the outer sides of the limbs of the punch or chisel are smallest in the vicinity of the cutting edge.

At its upper end the punch 1 is pivotally connected to an extension 11 which moves in a hollow cylindrical part 12 of the casing 5. The upper end of the extended portion 11 is formed with a reinforced head 13 which fits and is guided inside the part 12, and is provided at the top part with a roller 14. This roller is pressed against the periphery of a curved disc or cam 15 by a spring 16 which continually urges the ram or punch into its uppermost position.

The cam or disc 15 is rotatable about a pivot 17 in the casing 5 and is rotated by the electric motor 2 through a transmission gearing comprising a worm wheel 19 and a worm 18 which constitutes an extension of the shaft of the motor 2. A toothed wheel 21 is also located on the shaft 20 of the worm wheel and co-operates with a second gear wheel 22 arranged on the same pivot 17 as the disc or cam 15. The shafts of all these gear wheels are mounted in recesses in the casing 5 of the actuating mechanism, which casing is advantageously filled with oil or a lubricating material of similar consistency.

The curved outline of the cam 15 is so selected that when the cam is rotated the roller 14, and consequently the punch 1, are moved downwards against the action of the spring 16 with a uniform speed, and when a predetermined point in each rotation is reached, the punch moves rapidly back to its uppermost position under the influence of said spring.

A clip 24 is fastened to the bracket 6 carrying the anvil by means of screw bolts 23, and this clip passes around the lower part of the cylindrical extension 12 of the casing 5 and bears at its upper part against a collar 25 on said extension. When the clip 24 has been turned in relation to casing 5 into the desired angular position it can be clamped rigidly in place by means of a wing-nut 26. The clip 24 is held at the lower end of the part 12 by means of a screw threaded washer 27

which is screwed on a corresponding thread on the part 12 and is, in turn, positioned by a counter nut 28.

A packing bush comprising an inner fixed ring 29 and an outer screw-threaded ring 30 is provided at the place where the extension 11 of the punch 1 leaves the casing 12. The opening on the ring 29 for the passage of the part 11 is provided, at the part where the guide surface 31 is located, with a straight edge.

The ability of the two parts 1 and 11 to rotate relatively to one to the other is achieved in the following fashion:

A pin 32 is inserted in the lower end of the part 11 and has a head 33 of smaller diameter projecting beyond this part 11 and into a cup-shaped recess 34 in the upper end of punch 1 (see Fig. 4). A ring 35 is screwed into this hollow chamber 34 and fits around the head 33, being rotatable relative thereto. The ring 35 is held in place by a washer 36 and a rivetted head 37. Rotation of ring 35 relatively to the punch is prevented by pins 38.

The apparatus is further provided with two handles, one of which is the stirrup-shape handle 39 mounted on an arm 40 projecting from the motor housing. A press button contact 41 is arranged in the loop of the stirrup and enables the user to make or break the supply of current to the motor. The other handle, 42, is in the form of a peg and is parallel to the shaft of the electric motor.

The device as above described functions in the following fashion:

The roller 14 is pressed by the helical spring 16 (Fig. 3), which bears on the reinforced head 13 of the extension 11 of the punch, against the periphery of the cam 15. Consequently the punch or chisel will at all times be maintained by this spring in the highest position which it is able to occupy.

When the motor 2 is put into operation by pressing on the button 41, the cam 15 will be rotated through the intermediary of the worm and worm wheel gearing 18, 19, and the gear wheels 21, 22. In the result, the roller 14, and thus also the punch, will be forced downwardly periodically against the action of spring 16, i.e. towards the anvil 4. When a certain point on the periphery of cam 15 is reached during each stroke, the roller 14 is released from the cam and jumps upwards as a consequence of which the punch suddenly moves upwards. This procedure is repeated at a comparatively rapid rate.

Each time the punch reaches its lowest position in relation to the anvil 4, the portion of the plaster bandage or cast between these two parts is severed or smashed

into thin splinters which collect in the space 43 of the punch and in this way are removed.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Apparatus for removing plaster casts or bandages including a motor-actuated punch or chisel, and a co-operating anvil or spoon which is adapted to be inserted between the body and the bandage or cast, said punch or chisel having its lower portion of U or channel form in cross-section with the open side of the U facing a connection piece between the anvil or spoon and the main body of the apparatus.

2. Apparatus according to claim 1, wherein the upper portion of the punch or chisel is of U form, with the open side of the U facing away from the said connection piece.

3. Apparatus according to Claim 1 or 2, wherein the distance between the outer sides of the limbs of the punch or chisel is smallest in the vicinity of the cutting edge of this punch or chisel.

4. Apparatus according to any of the preceding claims, wherein the punch or chisel is provided with a pair of guide cheeks or lugs located one on each side of the said connection piece.

5. Apparatus according to claim 4, wherein a chisel-like guiding member is located between the cheeks or lugs and arranged to move in a guiding slot in said connection piece, and the downwardly directed cutting edge of the same is adapted to co-operate with a second cutting edge in the lower end of the guiding slot.

6. Apparatus according to any of the preceding claims, wherein the punch or chisel is longest at that edge remote from the connection piece.

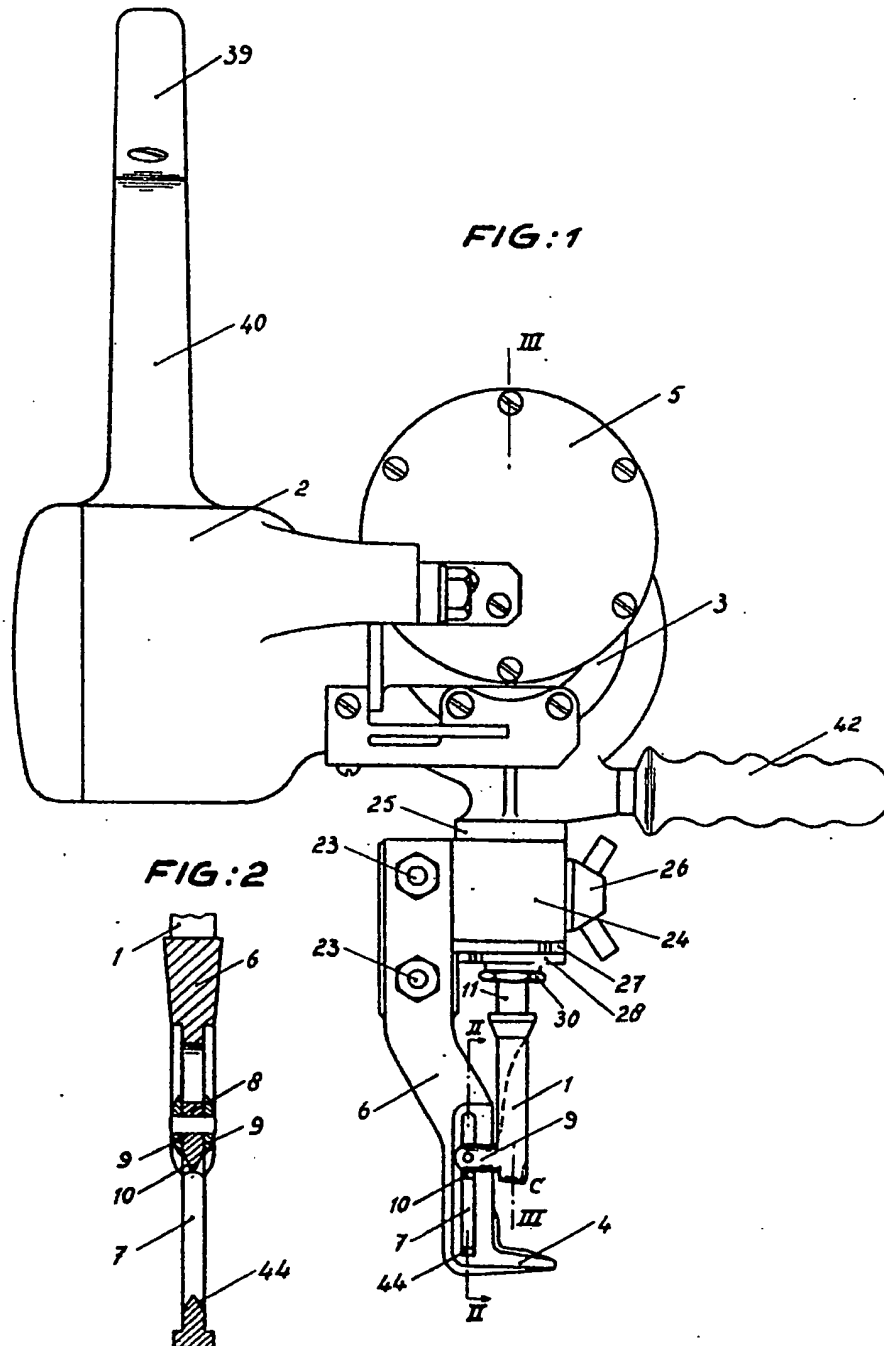
7. Apparatus according to any of the preceding claims, wherein the blade of the punch or chisel is adapted to engage the anvil or spoon when in its lowest position.

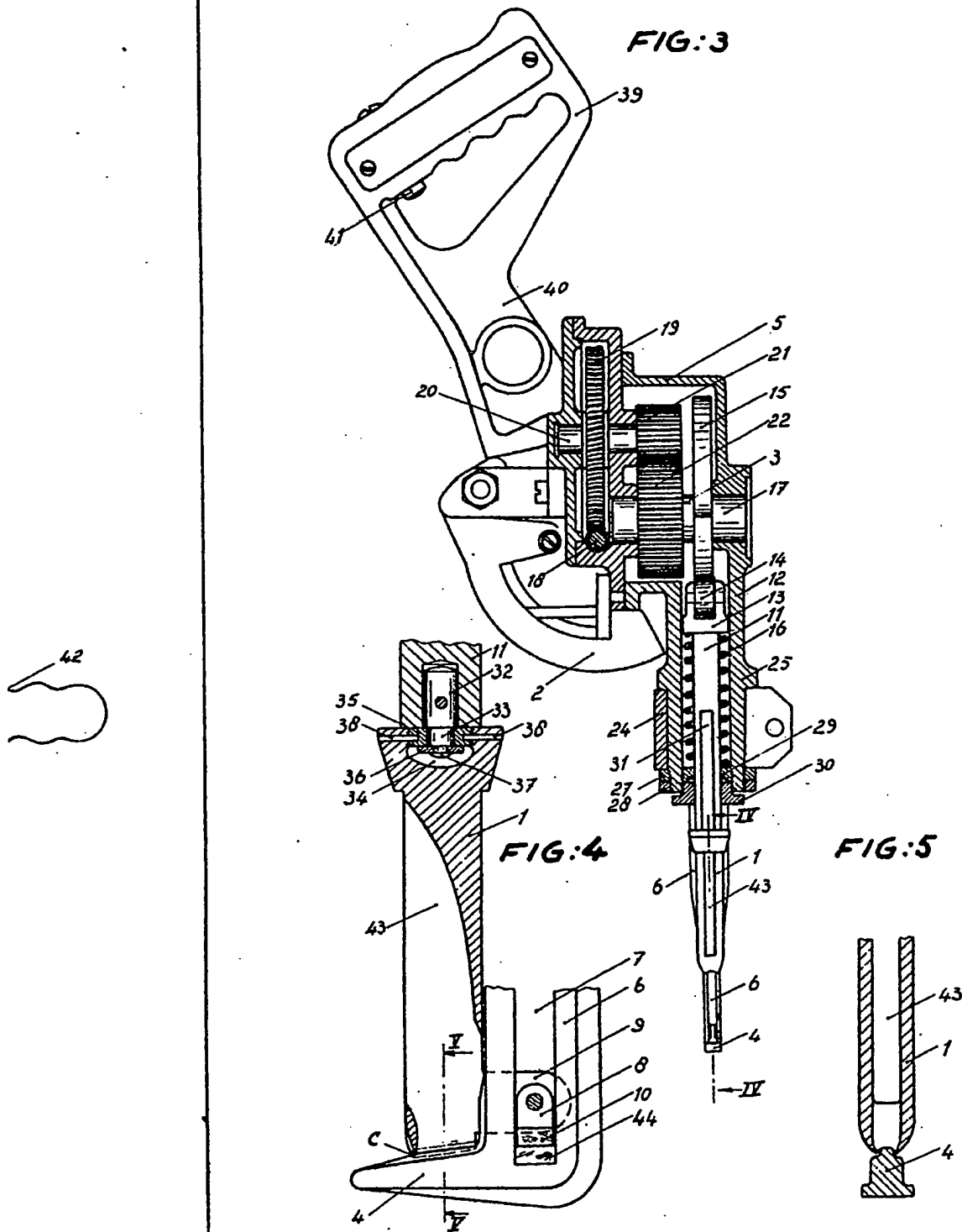
8. Apparatus for removing plaster casts or bandages substantially as herein described with reference to the accompanying drawings.

Dated this 28th day of October, 1937.

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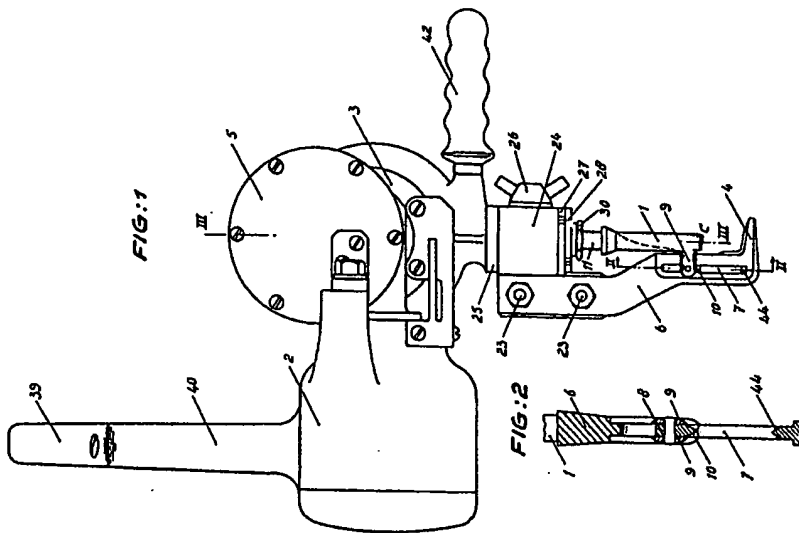


FIG. 2

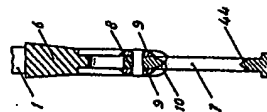


FIG. 3

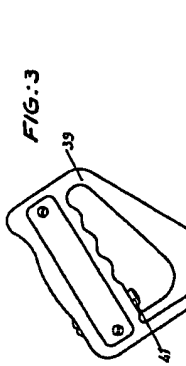


FIG. 4

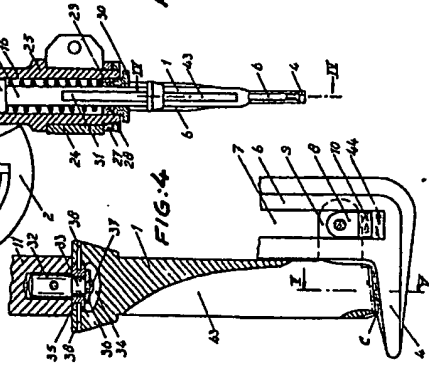
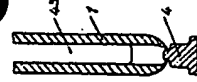


FIG. 5



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